Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL QUALITY MEASURES CLEARINGHOUSE

General

Title

Thoracic surgery: percentage of patients aged 18 years and older undergoing elective lung resection for lung cancer who developed any of the specified postoperative complications.

Source(s)

Society of Thoracic Surgeons (STS). General thoracic surgery database: NQMC measure submission. Chicago (IL): Society of Thoracic Surgeons (STS); 2016 Dec. 31 p.

Measure Domain

Primary Measure Domain

Clinical Quality Measures: Outcome

Secondary Measure Domain

Does not apply to this measure

Brief Abstract

Description

This measure is used to assess the percentage of patients aged 18 years and older undergoing elective lung resection (open or video-assisted thoracoscopic surgery [VATS] wedge resection, segmentectomy, lobectomy, bilobectomy, sleeve lobectomy, pneumonectomy) for lung cancer who developed any of the following postoperative complications: reintubation, need for tracheostomy, initial ventilator support greater than 48 hours, acute respiratory distress syndrome (ARDS), pneumonia, pulmonary embolus, bronchopleural fistula, bleeding requiring reoperation, myocardial infarction or operative mortality.

Rationale

Lung cancer is the second most common cancer (National Cancer Institute [NCI], "Common," 2016; NCI, "Cancer," 2016). An estimated 224,390 new cases of lung cancer are expected in 2016, accounting for about 13.3% of cancer diagnoses. Lung cancer accounts for more deaths than any other cancer in both men and women (American Cancer Society [ACS], 2016). Providing outcomes data to participating thoracic

surgery sites allows benchmarking of practice group results against the Society of Thoracic Surgeons (STS) national results and allows demonstration of improvement when quality improvement (QI) efforts are undertaken. These outcomes data aid clinicians and patients in making informed clinical decisions and also compare riskâ€adjusted outcomes for quality improvement purposes.

Evidence for Rationale

American Cancer Society (ACS). Estimated deaths for the four major cancers by sex and age group, 2016. Atlanta (GA): American Cancer Society (ACS); 2016. 1 p.

National Cancer Institute (NCI). Cancer statistics. [internet]. Bethesda (MD): National Institutes of Health (NIH); 2016 Mar 14.

National Cancer Institute (NCI). Common cancer types. [internet]. Bethesda (MD): National Institutes of Health (NIH); 2016 Feb 1.

Society of Thoracic Surgeons (STS). General thoracic surgery database: NQMC measure submission. Chicago (IL): Society of Thoracic Surgeons (STS); 2016 Dec. 31 p.

Primary Health Components

Thoracic surgery; elective lung resection; lung cancer; postoperative complications; reintubation; tracheostomy; initial ventilator support greater than 48 hours; acute respiratory distress syndrome (ARDS); pneumonia; pulmonary embolus; bronchopleural fistula; bleeding requiring reoperation; myocardial infarction; operative mortality

Denominator Description

Number of patients aged 18 years and older undergoing elective lung resection (open or video-assisted thoracoscopic surgery [VATS] wedge resection, segmentectomy, lobectomy, bilobectomy, sleeve lobectomy, pneumonectomy) for lung cancer (see the related "Denominator Inclusions/Exclusions" field)

Numerator Description

Number of patients aged 18 years and older undergoing elective lung resection (open or video-assisted thoracoscopic surgery [VATS] wedge resection, segmentectomy, lobectomy, bilobectomy, sleeve lobectomy, pneumonectomy) for lung cancer who developed any of the following postoperative complications: reintubation, need for tracheostomy, initial ventilator support greater than 48 hours, acute respiratory distress syndrome (ARDS), pneumonia, pulmonary embolus, bronchopleural fistula, bleeding requiring reoperation, myocardial infarction or operative mortality (see the related "Numerator Inclusions/Exclusions" field)

Evidence Supporting the Measure

Type of Evidence Supporting the Criterion of Quality for the Measure

A formal consensus procedure, involving experts in relevant clinical, methodological, public health and organizational sciences

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Additional Information Supporting Need for the Measure

Unspecified

Extent of Measure Testing

General Thoracic Surgery Database (GTSD) participating sites are randomly selected for participation in the Society of Thoracic Surgeons (STS) GTSD Audit, which is designed to evaluate the accuracy, consistency, and comprehensiveness of data collection and ultimately validate the integrity of the data contained in the database. Telligen, formerly the Iowa Foundation for Medical Care, has conducted audits on behalf of STS since 2006. In 2015, ten percent of randomly selected STS GTSD participants (N = 25, an increase from 24 in 2014 and 18 in 2013) were audited. The audit process involves reâ€abstraction of data for 20 cases records (at least 15 lobectomy and up to 5 esophagectomy) and comparison of 40 STS GTSD V2.2 individual data elements with those submitted to the data warehouse. Agreement rates are calculated for each variable, each variable category and overall. In 2015, the overall aggregate agreement rate was 97.02%, demonstrating that the data contained in the STS GTSD are both comprehensive and highly accurate.

Data Analysis

Aggregate agreement rates were computed for all facilities by calculation of the sum of all facilities' numerators divided by the sum of all facilities' denominators, for each individual variable, each variable category and overall.

Chi-square statistics were calculated to identify any possible relationships between the data collection process variables and agreement rates. Tests where the chi-square statistic had a probability of less than 5% (p less than 0.05) were considered to show statistically significant differences in agreement rate between the levels of the process measure.

Agreement Rate Results

Database validity was evaluated by re-abstraction of defined variables from the medical records and comparison to submitted data. Agreement rates were calculated at the individual variable level, category level and overall. Aggregate agreement rates are presented in the table in the original measure documentation. There were 14,854 total variables abstracted and of those 14,412 variables matched, resulting in an overall agreement rate of 97.02%.

Process Variable Correlation Tables

The relationships between process variables and overall agreement rates were examined and included:

- Facility data collection performed from electronic medical records or a combination of paper and electronic medical records and overall agreement rate
- Facility data collection method (concurrent/retrospective/both) and overall agreement rate
- Data collection performed by a single abstractor or multiple staff and overall agreement rate
- Attendance at the annual data managers' meeting, STS Advances in Quality and Outcomes (AQO) Conference, and overall agreement rate
- Agreed upon abstraction location for data elements documented in multiple locations and overall agreement rate

Relationship between Data Collection Source & Agreement Rate

Facilities using an electronic health record (EHR) for data collection had higher agreement rates, 97.36%, than those facilities using both paper medical records and an EHR, 96.31%. There were no facilities that

used paper medical records alone (p less than 0.0004).

Relationship between Data Collection Method & Agreement Rate

Facilities collecting data retrospectively have higher agreement rates, 97.55%, than those facilities collecting data concurrently, 96.18%, or both, 96.38% (p equal to or less than 0.0001).

Relationship between Data Collection Performed by a Single Abstractor or Multiple Staff & Agreement Rate

Facilities with a single individual performing data abstraction have higher agreement rates, 98.02%, than those facilities that have multiple individuals performing data abstraction, 96.24% (p less than 0.0001).

Relationship between Attendance at AQO Conference & Agreement Rate

Facilities having staff attend the annual AQO Conference have higher agreement rates, 97.25%, than those that do not have staff attend, 96.11% (p less than 0.0012).

Relationship between Have an Agreed Upon Location & Agreement Rate

Facilities that utilize an agreed upon location for data elements recorded in multiple locations have higher agreement rates, 97.31%, than facilities that do not utilize an agreed upon location, 93.61% (p less than 0.0001).

In addition, validity is regularly assessed by an expert panel of general thoracic surgeons assembled by the STS General Thoracic Surgery Database Task Force, the STS Quality Measurement Task Force, and the STS Task Force on Quality Initiatives, all of which report to the STS Workforce on National Databases.

Evidence for Extent of Measure Testing

Society of Thoracic Surgeons (STS). General thoracic surgery database: NQMC measure submission. Chicago (IL): Society of Thoracic Surgeons (STS); 2016 Dec. 31 p.

State of Use of the Measure

State of Use

Current routine use

Current Use

not defined yet

Application of the Measure in its Current Use

Measurement Setting

Hospital Inpatient

Professionals Involved in Delivery of Health Services

not defined yet

Least Aggregated Level of Services Delivery Addressed

Clinical Practice or Public Health Sites

Statement of Acceptable Minimum Sample Size

Unspecified

Target Population Age

Age greater than or equal to 18 years

Target Population Gender

Either male or female

National Strategy for Quality Improvement in Health Care

National Quality Strategy Aim

Better Care

National Quality Strategy Priority

Making Care Safer
Prevention and Treatment of Leading Causes of Mortality

Institute of Medicine (IOM) National Health Care Quality Report Categories

IOM Care Need

Living with Illness

IOM Domain

Effectiveness

Safety

Data Collection for the Measure

Case Finding Period

36 months

Denominator Sampling Frame

Patients associated with provider

Denominator (Index) Event or Characteristic

Clinical Condition

Institutionalization

Patient/Individual (Consumer) Characteristic

Therapeutic Intervention

Denominator Time Window

not defined yet

Denominator Inclusions/Exclusions

Inclusions
Number of patients aged 18 years and older undergoing elective lung resection (open or video-assisted thoracoscopic surgery [VATS] wedge resection, segmentectomy, lobectomy, bilobectomy, sleeve lobectomy, pneumonectomy) for lung cancer

Denominator Details

Lung cancer (LungCancer – Society of Thoracic Surgeons [STS] General Thoracic Surgery Database [GTSD] sequence number 830) is marked "yes" and category of disease – primary (CategoryPrim – STS GTSD sequence number 1300) is marked as one of the following (International Classification of Diseases, Ninth Revision [ICD-9], International Classification of Diseases, Tenth Revision [ICD-10]):

- Lung cancer, main bronchus, carina (162.2, C34.00)
- Lung cancer, upper lobe (162.3, C34.10)
- Lung cancer, middle lobe (162.4, C34.2)
- Lung cancer, lower lobe (162.5, C34.30)
- Lung cancer, location unspecified (162.9, C34.90)

Patient has lung cancer (as defined in #1 above) and primary procedure is one of the specific Current Procedural Terminology (CPT) codes for lung resection (refer to the original measure documentation for specific CPT codes)
Status of operation (Status – STS GTSD sequence number 1420) is marked as "elective"
Only analyze the first operation of the hospitalization meeting criteria 1 to 3

Exclusions
None

Exclusions/Exceptions

not defined yet

Numerator Inclusions/Exclusions

Inclusions
Number of patients aged 18 years and older undergoing elective lung resection (open or video-assisted thoracoscopic surgery [VATS] wedge resection, segmentectomy, lobectomy, bilobectomy, sleeve lobectomy, pneumonectomy) for lung cancer who developed any of the following postoperative complications: reintubation, need for tracheostomy, initial ventilator support greater than 48 hours, acute respiratory distress syndrome (ARDS), pneumonia, pulmonary embolus, bronchopleural fistula, bleeding requiring reoperation, myocardial infarction or operative mortality

Numerator Details: Number of patients undergoing elective lung resection for lung cancer for whom:

Postoperative events (POEvents – Society of Thoracic Surgeons [STS] General Thoracic Surgery Database [GTSD] sequence number 1710) is marked "yes" and one of the following items is marked "yes":

Reintubation (Reintube – STS GTSD v 2.2, sequence number 1850)/respiratory failure (RespFail – STS GTSD sequence number 1800)
Need for tracheostomy (Trach – STS GTSD sequence number 1860)
Initial ventilator support greater than 48 hours (Vent – STS GTSD sequence number 1840)
Acute respiratory distress syndrome (ARDS – STS GTSD sequence number 1790)
Pneumonia (Pneumonia – STS GTSD sequence number 1780)
Pulmonary embolus (PE – STS GTSD sequence number 1820)
Bronchopleural fistula (Bronchopleural – STS GTSD sequence number 1810)
Myocardial infarction (MI – STS GTSD sequence number 1900)
or

Unexpected return to the operating room (OR) (ReturnOR – STS GTSD sequence number 1720) is marked "yes" and primary reason for return to OR (ReturnORRsn – STS GTSD sequence number 1730) is marked "bleeding"

or

One of the following fields is marked "dead"

Discharge status (MtDCStat – STS GTSD sequence number 2200)
Status at 30 days after surgery (Mt30Stat – STS GTSD sequence number 2240)

Exclusions
Unspecified

Numerator Search Strategy

Institutionalization

Data Source

Administrative clinical data

Electronic health/medical record

Paper medical record

Registry data

Type of Health State

Adverse Health State

Instruments Used and/or Associated with the Measure

The Society of Thoracic Surgeons General Thoracic Surgery Database (GTSD) Major Procedure Data Collection Form Version 2.3

Computation of the Measure

Measure Specifies Disaggregation

Does not apply to this measure

Scoring

Rate/Proportion

Interpretation of Score

Desired value is a lower score

Allowance for Patient or Population Factors

not defined yet

Description of Allowance for Patient or Population Factors

The Society of Thoracic Surgeons (STS) General Thoracic Database (GTDB) was queried for all patients treated with resection for primary lung cancer between January 1, 2002 and June 30, 2008. Three separate multivariable risk models were constructed (mortality, major morbidity, and composite mortality or major morbidity).

Thoracic surgeons participating in the STS GTDB perform lung cancer resections with a low mortality and morbidity. Predictors of mortality include the following: pneumonectomy, bilobectomy, American Society of Anesthesiology rating, Zubrod performance status, renal dysfunction, induction chemoradiation therapy, steroids, age, urgent procedures, male gender, forced expiratory volume in one second, and body mass index. These models have excellent performance characteristics and will help surgeons and patients estimate perioperative risk and provide risk-adjusted outcomes for quality improvement.

For more information, refer to *STS Database Risk Models: Predictors of Mortality and Major Morbidity for Lung Cancer Resection* (see the "Companion Documents" field).

Standard of Comparison

not defined yet

Identifying Information

Original Title

Risk-adjusted morbidity and mortality for lung resection for lung cancer.

Measure Collection Name

General Thoracic Surgery Measures

Submitter

Society of Thoracic Surgeons - Medical Specialty Society

Developer

Society of Thoracic Surgeons - Medical Specialty Society

Funding Source(s)

Unspecified

Composition of the Group that Developed the Measure

The Society of Thoracic Surgeons (STS) General Thoracic Surgery Database Task Force. Please contact STS for list of members.

Financial Disclosures/Other Potential Conflicts of Interest

Unspecified

Endorser

National Quality Forum - None

NQF Number

not defined yet

Date of Endorsement

2016 Oct 17

Adaptation

This measure was not adapted from another source.

Date of Most Current Version in NQMC

2016 Dec

Measure Maintenance

Unspecified

Date of Next Anticipated Revision

Unspecified

Measure Status

This is the current release of the measure.

Measure Availability

Source not available electronically.

For more information, contact the Society of Thoracic Surgeons (STS) at 633 N. Saint Clair Street, Floor 23, Chicago, IL 60611; Phone: 312-202-5800; Fax: 312-202-5801; Web site: http://www.sts.org .

Companion Documents

This following is available:

> Kozower BD, Sheng S, O'Brien SM, Liptay MJ, Lau CL, Jones DR, Shahian DM, Wright CD. STS database risk models: predictors of mortality and major morbidity for lung cancer resection. Ann Thorac Surg. 2010 Sep;90(3):875-81; discussion 881-3. Available from the Annals of Thoracic Surgery Web site .

NQMC Status

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Production

Source(s)

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